ECOSYSTEM-BASED MANAGEMENT INDICES AND INFORMATION

Ecosystem Goal: Maintain and Restore Fish Habitats

Groundfish bottom trawl fishing effort in the Gulf of Alaska, Bering Sea and Aleutian Islands

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The amount of effort (as measured by the number of days fished) in bottom trawl fisheries is used as an indicator of the effects of trawling on habitat. In general, bottom trawl effort in the Gulf of Alaska and Aleutian Islands has declined as pollock and Pacific cod TACs have been reduced (Figure 123). Effort in the Bering Sea remained relatively stable from 1991 through 1997, peaked in 1997, then declined (Figure 123). The magnitude of the Bering Sea trawl fisheries is twice as large in terms of effort than both the Aleutian Islands and Gulf of Alaska combined. Fluctuations in fishing effort track well with overall landings of primary bottom trawl target species, such as flatfish and to a lesser extent pollock and cod. As of 1999, only pelagic trawls can be used in the Bering Sea pollock fisheries.

The locations where bottom trawls have been used are of interest for understanding habitat effects. The following figures show the spatial patterns and intensity of bottom trawl effort, based on observed data. Spatial changes in fisheries effort may in part be affected by fishing closure areas (i.e., Steller sea lion protection measures) as well as changes in markets and increased bycatch rates of non-target species. These changes in effort can be observed by examining effort for the current year relative to the average effort in prior years of fishing (effort anomalies).

Bering Sea

For the period 1990-2004, there were a total of 271,057 observed bottom trawl sets in the Bering Sea fisheries. During 2003, trawl effort consisted of 111,777 sets which was the low for the 10 year period. Spatial patterns of fishing effort were summarized on a 5km^2 grid (Figure 124). Areas of high fishing effort were north of False Pass (Unimak Island) as well as the shelf edge represented by the boundary of report areas 513 and 517. The primary catch in these areas was Pacific cod and yellowfin sole. In 2004, fishing effort was anomalously high in areas 509 and 516 (Figure 124) where there were catches of Pacific cod, pollock and rockfish.

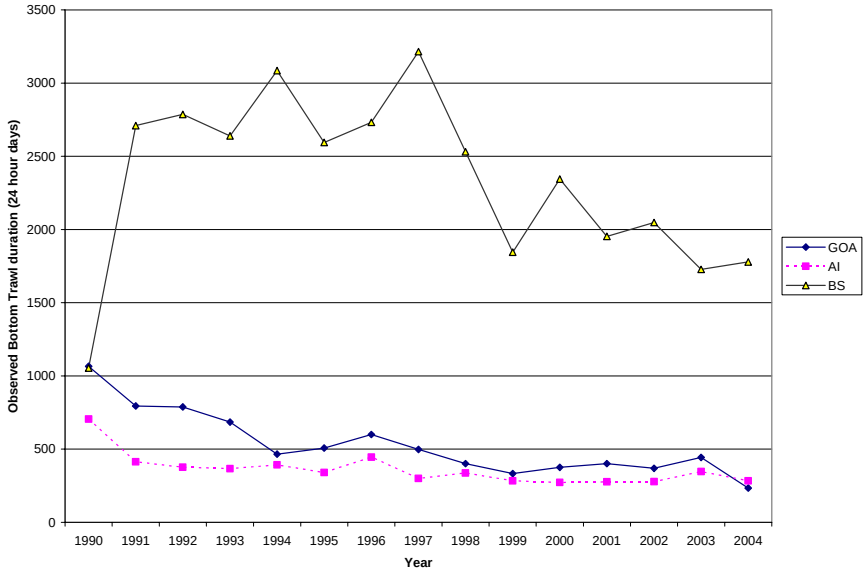

Figure 123. Estimated bottom trawl time in the Gulf of Alaska, Bering Sea, and Aleutian Islands during 1990-2004.

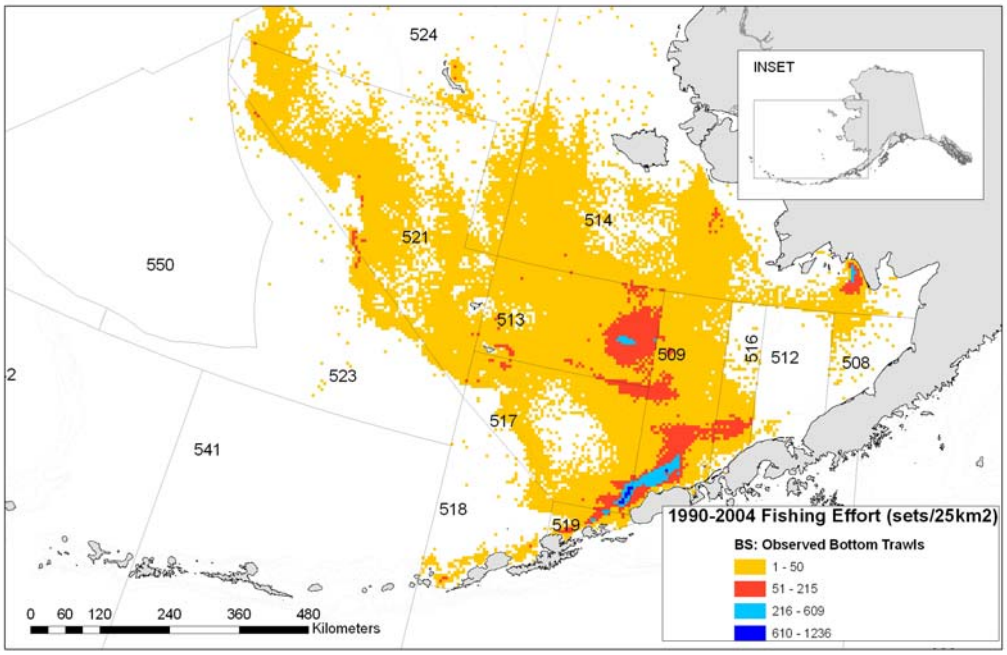

Figure 124. Spatial location and density of bottom trawling in the Bering Sea, 1990-2004.

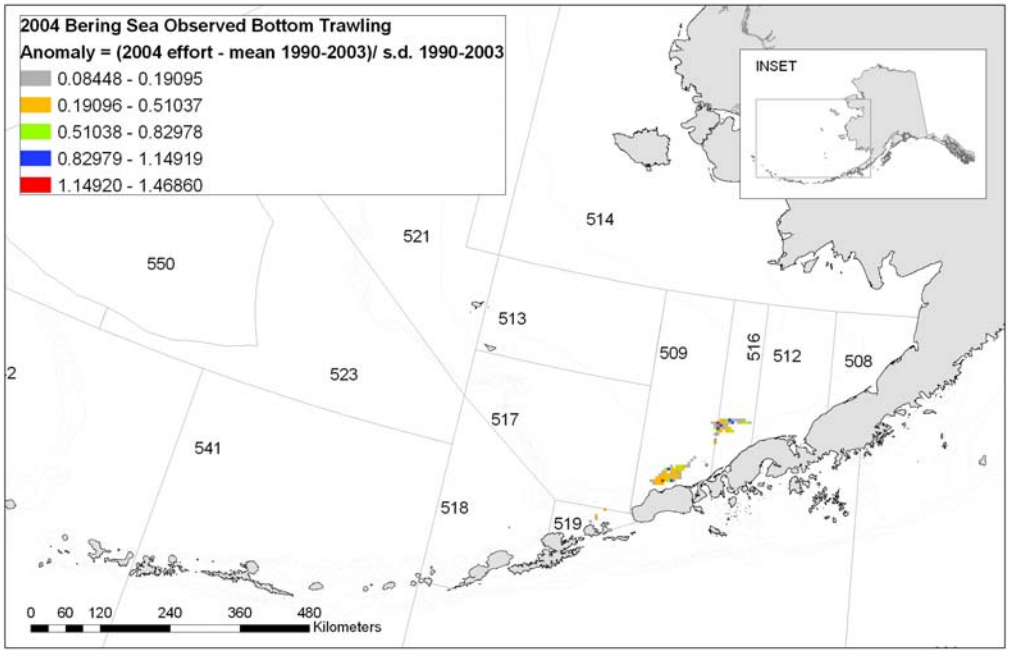

Figure 125. Fishing effort in 2004 shown as an anomaly relative to previous years of fishing effort (1990-2003) for Bering Sea observed bottom trawls ((estimated effort for 2004 minus average effort from 1990-2003)/stdev(effort from 1990-2003)).

Aleutian Islands

For the period 1990-2004 there were 43, 465 observed bottom trawl sets in the Aleutian Islands. The spatial pattern of this effort was dispersed over a wide area. During 2004, the amount of trawl effort was 2,347 sets, which was the low for the 10 year period. Patterns of high fishing effort were dispersed along the shelf edge (Figure 126). The primary catches in these areas were pollock, Pacific cod, and Atka mackerel. Catch of Pacific ocean perch by bottom trawls was also high in earlier years. In 2004, fishing effort was anomalously high in areas 541 and 543 and fisheries in these areas targeted Atka mackerel, Pacific cod and rockfish (Figure 127).

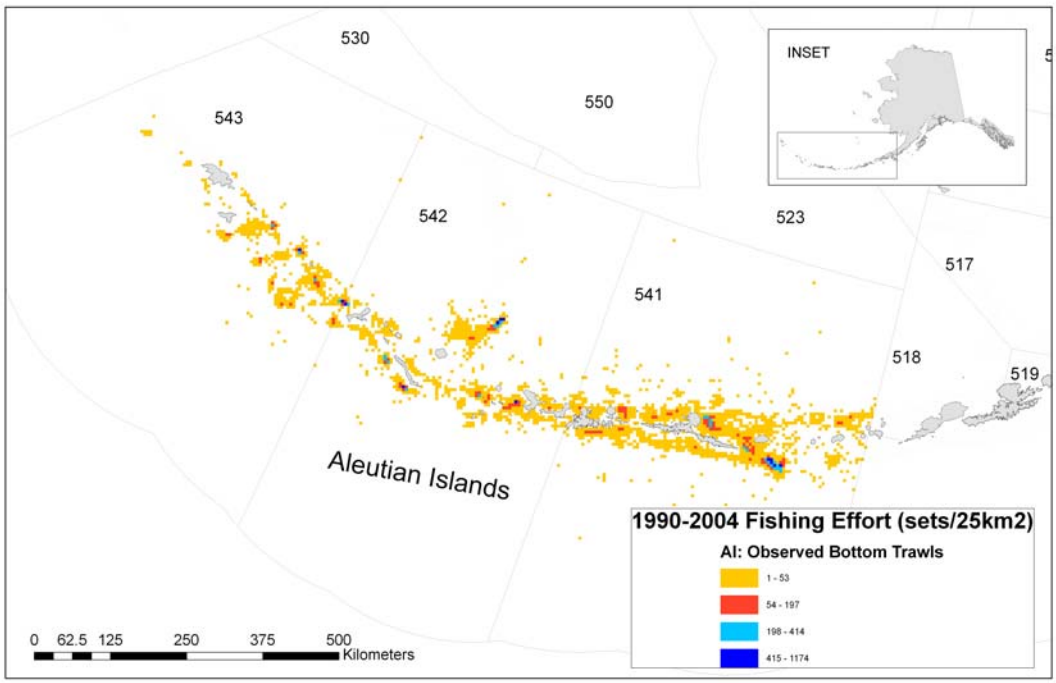

Figure 126. Spatial location and density of bottom trawl effort in the Aleutian Islands, 1990-2004.

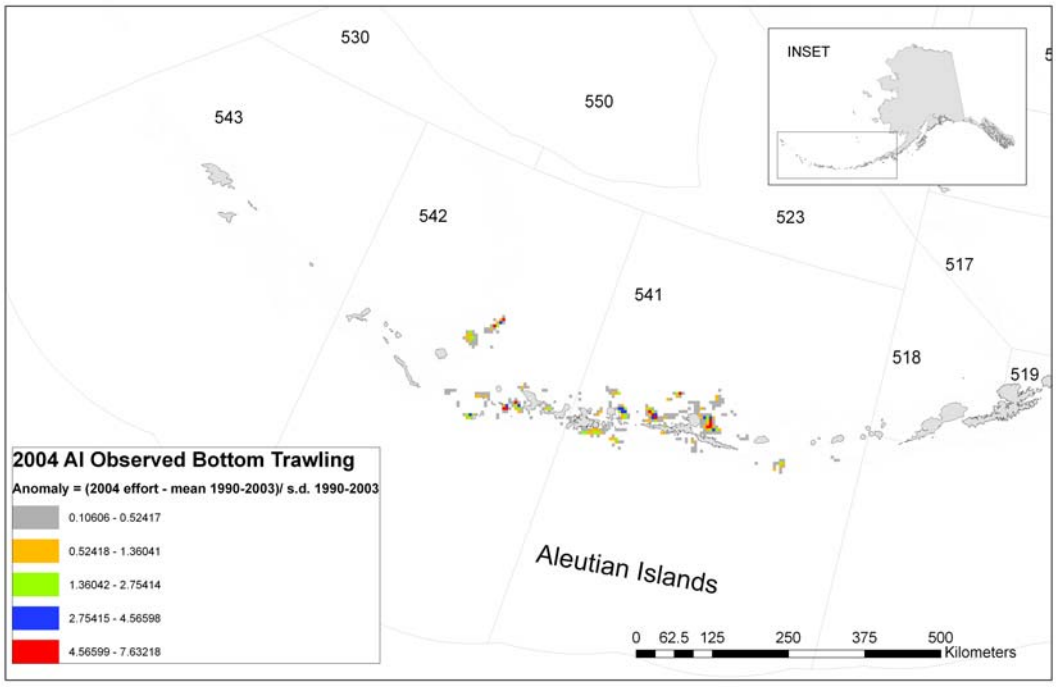

Figure 127. Fishing effort in 2004 shown as an anomaly relative to previous years of fishing effort (1990-2003) for Aleutian Islands observed bottom trawls ((estimated effort for 2004 minus average effort from 1990-2003)/stdev(effort from 1990-2003)).

Gulf of Alaska

For the period 1990-2004 there were 76,752 observed bottom trawl sets in the Gulf of Alaska. The spatial pattern of this effort was much more dispersed than in the Bering Sea region. During 2000, the amount of trawl effort was 3,443 sets. Patterns of high fishing effort were dispersed along the shelf edge with high pockets of effort near Chirkoff, Cape Barnabus, Cape Chiniak and Marmot Flats (Figure 128). Primary catches in these areas were pollock, Pacific cod, flatfish and rockfish. A larger portion of the trawl fleet in Kodiak is comprised of smaller catcher vessels that require 30% observer coverage, indicating that the actual amount of trawl effort would be much higher since a large portion is unobserved. In 2004, fishing effort was anomalously high along the shelf break and northeast of Kodiak Island (Figure 129). Fish caught in these areas were arrowtooth flounder, Pacific cod, rockfish, and shallow-water flatfishes.

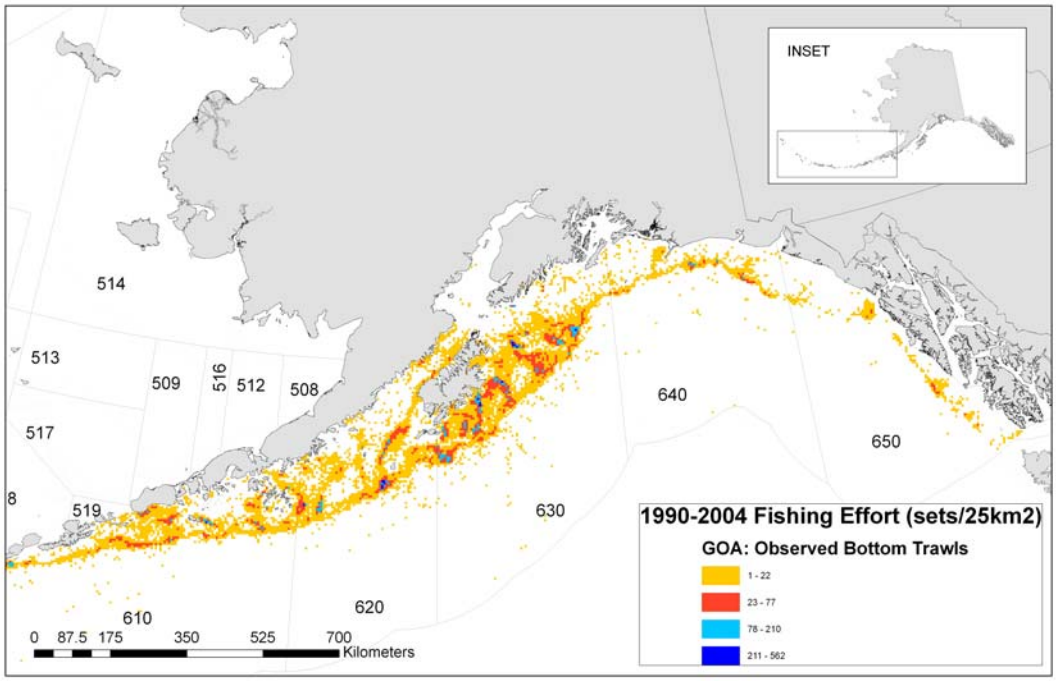

Figure 128. Spatial location and density of bottom trawl effort in the Gulf of Alaska, 1990-2004.

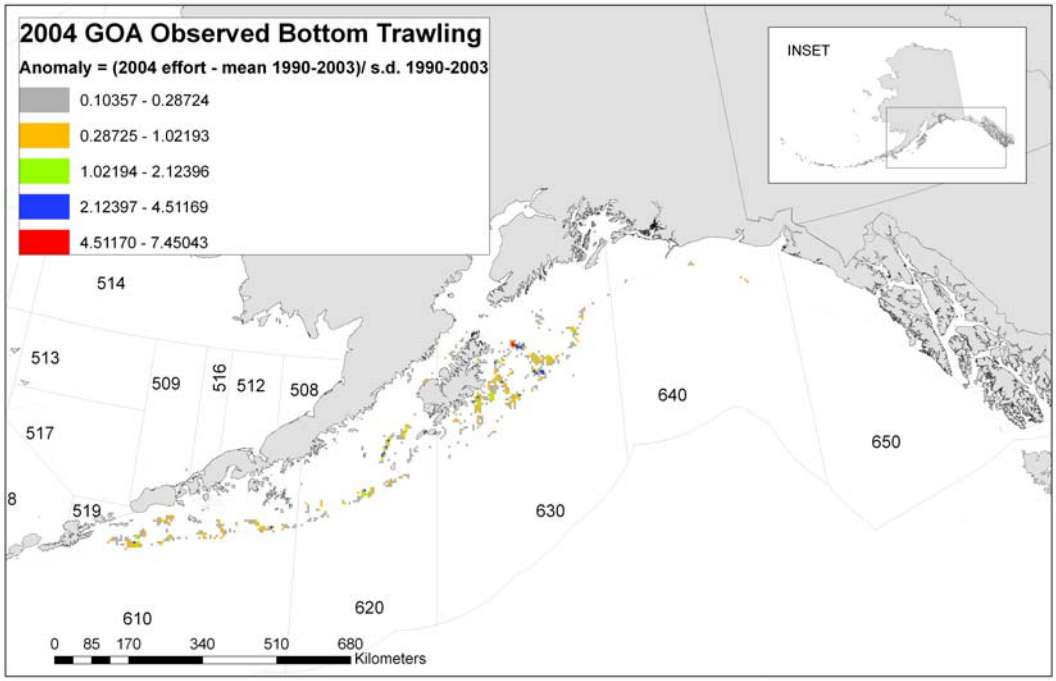

Figure 129. Fishing effort in 2004 shown as an anomaly relative to previous years of fishing effort (1990-2003) for Gulf of Alaska observed bottom trawls ((estimated effort for 2004 minus average effort from 1990-2003)/stdev(effort from 1990-2003)).